

NOMENCLATURE AND TYPIFICATION IN THE GENUS
USNEA (LICHENIZED ASCOMYCETES)—
III. *USNEA ALATA* & *USNEA SULCATA*

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ABSTRACT

This paper, the third in a series presenting cases of confusion of nomenclature and typification in the genus *Usnea*, discusses two names of pendent, apotheciate, angulose *Usnea* species from South America. The first, *Usnea alata* Motyka, was not correctly typified by Motyka (1937) at the time of description and is lectotypified here. The second, *Usnea sulcata* Motyka, has been misapplied due to a lectotypification that is in conflict with the protologue; the species is thus re-lectotypified here. A lectotype is also selected for the name *U. angulata* f. *ferruginea* Krempelhuber, which is considered a synonym of *U. sulcata* var. *sulcata*.

RESUMEN

Este artículo, el tercero de una serie que presenta casos de confusión en la nomenclatura y tipificación en el género *Usnea*, discute dos nombres de especies de *Usnea* colgantes, con apotecios, angulosas de Sur América. El primero, *Usnea alata* Motyka, no fue tipificado correctamente por Motyka (1937) en el momento de su descripción y se lectotipifica aquí. El segundo, *Usnea sulcata* Motyka, ha sido mal aplicado debido a una lectotipificación que está en conflicto con el protólogo; La especie es pues re-lectotipificada aquí. También se selecciona un lectotipo para el nombre *U. angulata* f. *ferruginea* Krempelhuber, que es considerado un sinónimo de *U. sulcata* var. *sulcata*.

I. *Usnea alata* Motyka

Usnea alata Motyka is one of the pendent, angulose, apotheciate species of *Usnea* known to occur in South America. Though Motyka (1937) clearly intended a specimen in the Vainio herbarium (TUR) to serve as the type, no specimen annotated as the type by him has been located there. As noted by Alava (1986) there are in fact two specimens matching the collection data given in the protologue. One of these specimens (TUR-VAINIO #000492) represents a collection not distributed in Vainio's *Lichenes Brasiliensis Exsiccati* and the other (TUR-VAINIO #00493) is a duplicate of *Lichenes Brasiliensis Exsiccati* #395. Since Motyka did not indicate if he intended the exsiccati collection to serve as the type there is no way to conclude with certainty which of these two specimens Motyka might have regarded as the type. Thus, we have chosen to lectotypify the species using the specimen distributed in Vainio's exsiccati instead of simply assuming its status as the holotype. It should be noted that Her-

rera-Campos et al. (1998) did not effectively lectotypify *U. alata* when they stated "TYPE: BRAZIL, Minas Geraes, *Chequeira*, 1885 (TUR holotype)..." because a single specimen was not cited and two specimens are present in Vainio's herbarium.

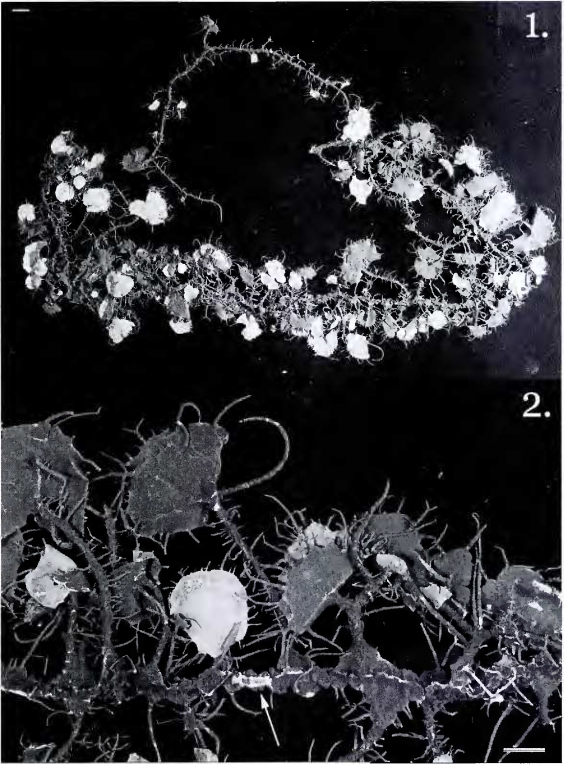
The specimen here selected as the lectotype agrees well with Motyka's protologue and all duplicates of this collection reviewed by the first author are conspecific with the specimen selected as the lectotype.

Usnea alata Motyka, Lich. gen. *Usnea* 2(1):395–396. 1937. (Figs. 1–2). TYPE: BRAZIL, MINAS GERAES: *Chequeira*, in arbore, 1885. *Vainio s.n.* = *Lichenes Brasiliensis Exsiccati* #395 (LECTOTYPE, here designated: TUR! (Vainio Herbarium #00493); ISOLECTOTYPE: SI)

Though *U. alata* was considered a distinct taxon by Herrera-Campos et al. (1998) it seems likely that some authors would consider it conspecific with *U. sulcata* Motyka (as redefined here). These two taxa differ in a number of respects, however, including the type of angulation of the branches, structure and shape of the fibrils, size of the apothecia, and overall appearance. Furthermore, much confusion has apparently resulted from the fact that Motyka changed his interpretation of *U. alata* prior to the publication of the monograph and after he annotated most of the specimens cited therein. That Motyka re-interpreted *U. alata* shortly before its publication is evidenced by the fact that many specimens in S that were annotated by Motyka as *U. alata* or "*U. angulata* var. *alata*" were cited by him as paratypes of *U. sulcata* var. *neutra* Motyka. Indeed, these specimens are not referable to *U. alata* in the sense of the type because they possess apothecia that are generally smaller than those of the type, the branches are angulose (having parallel ridges or sharp foveae) instead of alate, the fibrils are long, slender, regular, and abundant, and the chemistry of the type of *U. alata* apparently differs from that of *U. sulcata* var. *neutra*. (Incidentally, Motyka (1937) reported the type of *U. alata* to have a KOH- medulla; however as reported by Herrera-Campos et al. (1998) the type actually contains norstictic and connorstictic acids.) It is tempting to consider the possibility that *U. alata* represents the non-sorediate, fertile counterpart to *U. paradoxa* Motyka (as defined by Lendemer & Tavares 2003).

II. *Usnea sulcata* Motyka

While the first author was working with *U. angulata* Acharius, a number of problems in typification and taxonomy were encountered involving taxa recently placed in synonymy with *U. angulata* by other authors (Awasthi 1986; Herrera-Campos et al. 1998; Ohmura 2001). One such synonym is *U. sulcata* Motyka. Motyka (1937) described *U. sulcata* without the mention of soralia and with the description of small pruinose apothecia. As Tavares (2002) has noted, this taxon (originally described as apotheciate) was lectotypified with a soraliate specimen that lacked apothecia and the species was then placed in synonymy with *U. angulata* (Awasthi 1986). *Usnea angulata* in our opinion is a



FIGS. 1–2. *Usnea alata*. **Fig. 1.** Lectotype thallus. **Fig. 2.** Detail of lectotype: strongly alate branch with “winged” secondary branch attachments; arrow indicates cut through branch showing internal anatomy. Scale bar = 0.5 cm.

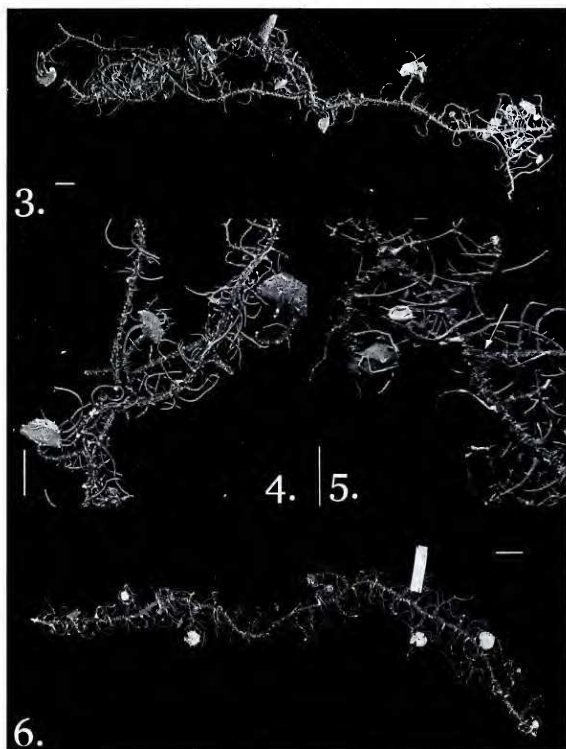
soraliolate species from eastern North America and northern Mexico. Apparently these names were placed into synonymy because the lectotype selected by Awasthi (1986) is densely soraliolate (not apotheciate) and thus superficially similar to *U. angulata*. All later workers with the exception of Tavares (2002) have continued to include *U. sulcata* as a synonym of *U. angulata*.

Motyka's designation of the type specimen of *U. sulcata* was simply "Typus in Musco Botan. Univ. Fennicae in Turku.—Locus classicus: Brasilia, Minas Geraës, Sitio, 1885 Vainio." As noted by Tavares (2002) there are four specimens in TUR-VAIN matching this description, one of which (TUR-VAIN 00450) was selected by Awasthi as the lectotype. One of us (JCL) has examined all four of these specimens; three of the four thalli are soraliolate and thus not suitable candidates for lectotypification. A fourth thallus, though not soraliolate, is small, poorly developed, and lacking apothecia. This fourth specimen is a possible candidate for lectotypification (since it does not possess soralia); however, it is too poorly developed to allow positive identification as *U. sulcata* and does not possess apothecia, a feature Motyka described in the protologue. It would seem, therefore, that none of the specimens in TUR-VAIN matching Motyka's published data are ideal for lectotypification. It should be noted that Vainio (1890) stated that all of the specimens of "*U. angulata*" from Sitio were sterile. Interestingly, though the specimens at Turku that were collected at Sitio are not apotheciate, all of the other specimens we have examined that Motyka cited in the protologue are either apotheciate, pycnidial, or lack both apothecia and pycnidia but are not soraliolate. Likewise, with the exception of the specimens distributed by Vainio in his *Lichenes Brasilienses Exsiccati*, all of the exsiccati specimens (that we have examined) cited by Motyka in the protologue also are either apotheciate or pycnidial. There is, however, a specimen in Motyka's herbarium (now at LBL) labeled as having come from Sitio that is apotheciate and it is this specimen that we select as the lectotype.

The comparisons Motyka (1937) made between *U. sulcata* and other taxa also serve to confirm that the lectotype selected by Awasthi conflicts with the published diagnosis. Motyka contrasted *U. sulcata* with *U. paradoxa* Motyka, a soraliolate taxon (see Lendemer & Tavares 2003) and placed in synonymy with *U. sulcata* a previously described form and a variety of *U. angulata* (*U. angulata* forma *ferruginea* Krphb. and *U. angulata* var. *rubiginosa* Hillmann), both of which are based on apotheciate specimens. Unfortunately, the type material of *U. angulata* var. *rubiginosa* Hillmann was destroyed during World War II and thus is not available for study. It is retained here as a questionable synonym.

Usnea sulcata Motyka var. **sulcata**, Lich. gen. *Usnea* 2(1):478–480. 1937. (Figs. 5–6). TYPE: BRAZIL: MINAS GERAES: Sitio, 1885, Vainio s.n. (LECTOTYPE, here designated: LBL #300.7 (fragment figured here).

= *Usnea angulata* Acharius forma *ferruginea* Krempelhuber. Flora 61(28):437. 1878. TYPE: Lorentz & Hieronymus s.n. (LECTOTYPE, here designated: M; ISOLECTOTYPE: UCJ).



FIGS. 3–6. *Usnea sulcata* var. *neutra*. **Fig. 3.** Lectotype thallus. **Fig. 4.** Detail of lectotype: angulose branch. *Usnea sulcata* var. *sulcata*. **Fig. 5.** Detail of lectotype: arrow indicates papillate “winged” secondary branch attachment. **Fig. 6.** Lectotype thallus. Scale bar = 0.5 cm.

(?) = *Usnea angulata* Acharius var. *rubiginosa* Hillmann, Repert. Spec. Nov. Regni Veg. 27(16-25):291. 1930. TYPE: BRAZIL. Sellow s.n. (HOLOTYPE: B, destroyed).

The lectotype packet (LBL 300.7.) of *U. sulcata* contains fragments of several thalli, four of which possess apothecia. The fragment selected here as the lectotype contains norstictic, caperatic, and connorstictic acids by TLC (R.C. Harris, pers. comm.) and thus is chemically similar to the type of *U. alata* Motyka. It is important to note that the lectotype selected here differs in appearance from the soraliolate specimen previously selected as the lectotype (by Awasthi 1986) and possibly does not represent part of the same gathering.

Since we have shown here that *U. sulcata* Motyka is in fact an apotheciate species from South America the previously accepted synonymy with *U. angulata* Acharius should be rejected. *Usnea angulata* f. *ferruginea* Krempelhuber was described without the designation of a type; thus here we have chosen to select the specimen in Krempelhuber's herbarium (M) as the lectotype. It should be noted that the red coloration which Krempelhuber's epithet suggests is not actually a pigmentation of the cortex such as that seen in *U. michauxii* L.L. Tavares or *U. pensylvanica* Motyka but instead is simply a discoloration of the entire collection. No other collection with similar discoloration has been seen by us.

Motyka (1937) also described *U. sulcata* var. *neutra* Motyka on the basis of its medulla having a negative KOH reaction. Later, Rizzini (1952) elevated this taxon to specific rank. Subsequent authors have not discussed this taxon; when re-evaluating the status of the other apotheciate angulose taxa in South America it became clear that *U. sulcata* var. *neutra* was also in need of revision. The type specimen was indicated by Motyka (1937) to be in his personal herbarium (now at LBL); however no such specimen was located in a loan of specimens from LBL of the apotheciate angulose taxa discussed here. Furthermore, it was also clear that there exists much confusion in the use of this name because prior to publishing the name *U. sulcata* var. *neutra* Motyka included specimens later cited as paratypes of *U. sulcata* var. *neutra* in his concept of *U. alata* Motyka. In order to affix the usage of the name *U. sulcata* var. *neutra* to a specimen, we have chosen to lectotypify the name with one of three specimens from S matching the data given in Motyka's protologue. All of these specimens differ chemically from the type *U. sulcata* var. *sulcata* (see below).

***Usnea sulcata* Motyka var. *neutra* Motyka, Lich. gen. Usnea 2(1):480-481. 1937. (Figs. 3-4). *Usnea neutra* (Motyka) Rizzini, Revista Brasil. Biol. 12(4):page #. 1952. TYPE: BRAZIL, MINAS GERAES: Cade de Caldas. 1879. Regnell s.n. (LECTOTYPE, designated here: S! #L160 (apotheciate fragment figured here).**

Of the specimens lent to the first author from S, three specimens matched the data given in Motyka's protologue for the type of *U. sulcata* var. *neutra* Motyka. Only the specimen selected here as the lectotype was actually identified as *U.*

sulcata var. *neutra* (R. Santesson, undated annotation) and marked "TYPUS" (not in Motyka's hand). It is important to note, however, that at present we do not consider *U. alata* and *U. sulcata* var. *neutra* to be synonyms because they differ both chemically and morphologically. We also prefer to retain *U. sulcata* var. *neutra* as distinct from *U. sulcata* var. *sulcata* because the type specimens of the two taxa also differ on chemical and morphological grounds. (The lectotype of *U. sulcata* var. *neutra* contains the stictic acid complex in addition to usnic and norstictic acids whereas the lectotypes (selected here) of *U. alata* and *U. sulcata* var. *sulcata* lack the stictic acid complex.) As noted above, Rizzini (1952) elevated Motyka's epithet to specific rank; we however choose to follow Motyka's original placement pending further study. It should be noted that *U. sulcata* var. *neutra* Motyka is not synonymous with *U. angulata* var. *neutra* Motyka ex Räsänen, a soraliolate taxon. The latter name will be treated in a future publication (Lendemer in prep.).

ACKNOWLEDGMENTS

We wish to thank Orvo Vitikainen (H) for providing data associated with the lectotype of *U. angulata* as well as Paul Silva (UC) for providing nomenclatural advice; also, we thank Soili Stenroos (TUR) for providing access to the Vainio specimens from Sitio, and Jan Bystrek (LBL) for locating the material from Motyka's herbarium. Also, we wish to thank James Macklin (PH) and Richard Moe (UC) for reviewing drafts of the manuscript, the curators of B, LBL, M, and TUR, for loaning material to the first author, and R.C. Harris for performing TLC on several of the specimens cited here.

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